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CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

AUTOMATED CONTROL SYSTEMS: PLANS AND PRACTICE

Moscow SOVETSKAYA TORGOVLYA in Russian 9 Dec 76 p 2

[Article by F. Gorodisskiy, Doctor of Economics and Director of the Division of Territorial ASU's of the VNIIET-Systems: "ASU: Plans and Practice"]

[Text] Automated control systems are the most efficient and advanced instrument of the modern scientific and technical revolution. Through automation it becomes possible to solve comprehensively the economic-administrative and commercial-trade problems of the development of our sector.

ASU [automated control systems] in trade (ASUT) began to be developed and utilized from the beginning of the 1970's. At the present time specific experience has already been accumulated in the creation of ASU's of various types and the first line in a series of such systems has been introduced: the industrial ASU for State trade (OASUT), the ASUT of the Bryansk oblast, the ASU of the Leningrad Gostinyy Dvor [department store], the Moscow GUM [department store], and others.

At present it is already possible to consider the initial period completed for the creation of ASU's in trade, the development of their theoretical foundations, and their experimental introduction. And as a result, it has become possible to determine the most effective means of creating the ASUT, of developing a progressive technology of systems planning, and, primarily, of the most advanced and economical model planning. One of the fundamental theories of control systems, proposed by Academician V. M. Glushkov, is that the needs of the entire USSR national economy, including not only industry but also construction, transportation, agriculture, trade, banking, etc., may be satisfied by 30-40 model automated control systems. On the basis of this, in the division of territorial ASU's of the All-Union Scientific Research Institute of the Economics of Trade and Control Systems elements of model plans of various ASUT's have been developed. The research indicated was directed at the reduction of the trade control network, at decreasing the number of the presently available 6-7 control levels, through the use of EVM [electronic computers] and ASU.

The research indicated that with the creation of an industrial ASU for the State trade of the country, instead of a group of ten individual plans it is possible to be restricted to only 4 types of model plans of ASUT's.

The first of these is the model plan of the automated control system for a trade enterprise. It may have 3 versions: the ASUT for retail businesses (department stores, self-service department stores), the ASUT for wholesale businesses (wholesale bases, cold-storage plants), and the ASU for the public catering industry (large dining-halls, training centers, factory kitchens, restaurants).

With the creation of the ASUT industry it is essential to develop a set of goals for the purpose of providing trade control by a direct technological process. It is expedient to include in this the following goals: the ordering of equipment of a warehouse or workshop by goods; the sorting out of an assortment; and the control of technical and technological operations and equipment.

The second model plan is the plan of an automated trade control system of a kray, an oblast, or a large city. During its creation it is necessary to consider that for all plans entering here the ASU must be a unified information base and a general technical facility. One multiple-user computer center for collective use (KVTSKP) is needed, and the available computer center offices and stations in trade enterprises and organizations must become its affiliated branches and its peripheral information-dispatching points. In the prospect for the creation of the second phase of the ASU this multiple-user KVTSKP, equipped with several EVM's, may become the technical base for the ASU of the user-cooperative of a given kray or oblast.

The third model plan is the plan of the automated control system for the trade activity of the Ministry of Trade of a Union Republic and an ASSR. Such an ASUT must be a complex composed of the ASU of the administrative apparatus of the Ministry of Trade of a republic and a series of ASU's for the trade of the krays and oblasts in this republic.

The fourth model plan is the plan of a local (autonomous) subsystem of the ASUT which is a member of an industrial ASU and an ASU of enterprises of other sectors of the national economy, the significance of which is their interaction with the trade ASU; for example in the industrial ASU (OASU) of the Ministry of Light Industry, the Ministry of the Catering Industry, and the Ministry of the Meat and Dairy Industry.

The functioning of the subsystems of the ASUT in the ASU of other departments permits the planning of the production of consumer goods on the basis of real information, originating from business conditions and popular demand, and it will contribute to the control of the quality of execution of supply agreements.

After the creation of model plans of each type they are circulated and introduced on an individual basis for each project and level of trade control.

Any of the model ASUT plans, for example the ASUT of the retail industry, may be used an unlimited number of times, but with an individual tie-in to a specific department store, self-service department store, base, or trade organization.

In all this work the most important question is that of the effectiveness of the model planning. The introduction of a modern, progressive technology for the creation of ASU's in trade on the basis of the four indicated ASUT model plans significantly reduces the time for establishing ASUT's and lowers by approximately five times the development cost of each individual plan.

The model planning and its associated possibility of ending the diffusion of effort permits the attainment of a unified scientific and technical policy in a sector by the creation of the ASUT. In the industrial scientific and research institutes it is found to be possible to concentrate the efforts of the system developers on the creation of scientifically proven model plans which are based on the modern EVM's of the unified system of the countries of the SEV /Council for Mutual Economic Aid/, i.e., the Unified System "Ryad" series computers.

Considerable losses are successfully avoided which individual planning incurs. The fact is that a number of ASUT's in industry are developed as isolated systems and have various structural, informational, mathematical, program-algorithmic and technical foundations. This makes it impossible to use them not only within the framework of the industrial ASUT but also in the automated system of planned accounting (ASPR) and excludes their interaction from national systems of the type ASU TsSU /the Central Statistical Administration/ of banks. Large and costly revisions are required so that these ASUT's, established, as the saying goes, piecemeal, may be incorporated into unified systems. Spreading in our sector, under the guise of the ASU, is the development of only a single subsystem--"bookkeeping." This is also a direct consequence of the establishment of individual ASU's; it is capable only of mechanizing bookkeeping. Such a practice is intolerable.

One of the most important methods of ASUT model planning is the utilization of model plan solutions. Its chief advantage lies in the possibility of developing only one engineering-manufacturing plan instead of the traditional two independent plans--engineering and manufacturing.

On the basis of experimental studies performed at the VNIIET-Systems in previous years, in the plan of the Institute for the 10th Five Year Plan are included the development of an engineering and manufacturing plan for the second phase of an automated system of planned "trade" accounting and model plan solutions of the ASUT of krays, oblasts and large cities. It must be said that the more promising these subjects are, the more important is their value for the improvement of control of the sector.

The utilization of their model plans for the construction of major new trade projects may exert a significant influence on the further expansion of

the ASUT's. The presence in the construction section of the technical documentation for these projects of a special heading "The Control of an Enterprise" and the selection of corresponding title allocations will guarantee the development and inclusion of an ASUT plan in the manufacturing plan of the construction, and it will further guarantee that the control system will be put into operation simultaneously with the trade projects becoming operational. This is especially important since at present it has become essential to provide for the planning of an ASUT (or an ASUT subsystem) without fail in each newly created trade production and territorial complex.

Simultaneously, in the title lists for the construction of large-scale trade projects there must be designated funds for planning the ASUT's of enterprises, for the acquisition of electronic computers and funds for data collection and processing and other essential equipment. The widespread introduction of model plans will promote the further development and introduction of ASU's in our sector.

8039
CSO: 1870

COMPUTER DESIGN PROJECTS

Moscow PRAVDA in Russian 18 Jan 77 p 3

[Article by V. Myasnikov, chief of the Main Administration for Computer and Control Systems of the State Committee on Science and Technology]

[Text] A complex dilemma is encountered by designers and planners in this age of scientific and technological revolution. You be the judge. On one hand, the quality of a project depends directly on the time period allowed for its development. Tardiness at this stage results in a moral obsolescence of engineering solutions used in construction of industrial, transportation and territorial complexes and machines. On the other hand, the increasing complexity of objects increases the time required for their planning.

Experience shows that development of a new technology always tends to become longer, even though the staff sizes of design and planning organizations increase continuously. That is not all. Lack of thoroughness during early stages of development becomes more and more evident. This backfires later in the form of need for lengthy "debugging" of prototypes, or as modifications which must be introduced in the course of manufacturing, resulting in loss of time and capital goods.

Thus, the lower quality and the lengthening of development periods are caused by the lack of correspondence between the complexity of contemporary technology and the outdated methods and means used in design and manufacturing. This problem cannot be solved by simply increasing the number of employees of design and planning organizations. According to the data supplied by the USSR Gosstroy, the productivity of labor in such organizations remains practically constant. Where then is the solution? The only answer is a wide application of mathematical methods and computers.

Domestic and foreign experience indicates that application of mathematical methods and of computers improves the technical level and the quality of projects and reduces the length of the design period and of the time required to master a new technology. The automation becomes especially effective

when separate engineering calculations are replaced by automated design systems (ADS) which combine together all development stages--from the time of conception of an idea to the technological preparation for production.

According to foreign sources, the use of computers reduces the design and debugging period of aircraft and rockets by two to three times and accelerates the preparation for manufacturing by three to five times, while simultaneously reducing the costs by 50 to 80 percent. The automobile industry now spends 8 to 12 months on development of a new model instead of 2 to 3 years. The cost of design and production tooling decreases by 30 percent and the number of designers decreases by 60 percent. The high effectiveness of computers is also well known to radio engineering, where the computers are used for design of electronic equipment, integrated circuits and multi-layer circuit boards.

Our country accumulated a definite amount of experience in automation of planning and design tasks. The ADS is being implemented intensively in those branches of national economy in which the complexity and the quick obsolescence of products require trial design work at high scientific and technical level during short periods of time.

The advantages of such systems are most appreciable in a socialist economy, where there are no barriers in the way of exchange of advanced experience and of technical achievements between various branches of economy.

We would like to emphasize here that design automation will allow publication and a wide circulation among various planning and design organizations of the most advanced as well as typical and standard methods of calculation, algorithms for optimization and installation and of different normative, standard and reference data. Under such conditions even a small design office will be able to use the most advanced methods of engineering calculations, borrowing them from other institutions.

The implementation of ADS became even more promising with the advent of large scientific and industrial associations. Here we have the possibility to create mutually related complexes, consisting of systems for automation of scientific investigations and processing of experimental data; systems for automated planning, design, technological preparations of production and; finally, systems for testing and production control. This suggests a close relationship to automated systems for control of technological processes.

The requirements imposed on effectiveness and quality of work of planning and design organizations elevate design automation to one of the central positions in the general strategy of computerization of national economy. In view of this, the State Committee for Science and Technology, in cooperation with various ministries and departments, developed and approved plans for creation of ADS. During the Ninth Five-Year Plan such systems were

being developed by more than 40 organizations and it is planned to add another 47 organizations to this group during the 10th Five-Year Plan.

In recent years a number of national ministries and departments became actively engaged in design automation. Organizations responsible for development of ADS in various branches of the economy were designated, budgetary appropriations were made and technical policies governing ADS implementation were defined. A valuable initiative was shown by the Ministry of Higher and Secondary Education of the RSFSR which organized a development of subsystems and software within a special "ADS Program" with participation of about 50 institutions of higher learning. Much work in this field is also done by the scientists of the USSR Academy of Sciences and of various Republic Academies.

Nevertheless, the extent to which ADS is applied to our national economy as a whole cannot be called satisfactory. What are the principal difficulties?

The creation of ADS is a laborious, complicated and lengthy process which requires good organization and perseverance. Experience shows that for the time being such tasks can be undertaken only by large planning and design organizations who already have an accumulated experience in application of computers to engineering calculations. Nevertheless, smaller design organizations and plant design offices can also successfully use separate algorithms, programs and subsystems of ADS with the help of available medium and small electronic computers.

For example, a relatively simple program for building construction enabled 67 construction design organizations to save one and a half million rubles in a single year on cost of calculations alone. According to the information supplied by the USSR Gosstroy, design programs for construction projects enable one to save up to three percent of building materials.

Therefore, one must distinguish between two substantially different but equally important approaches to the problem. One is the creation of systems by large, leading design and planning organizations and the other is a wide distribution of typical methods of calculation, algorithms and programs to medium, plant-size and other small planning and design organizations. This second approach is a very important part of the technical policy of design automation.

Unfortunately, a number of ministries and departments do not pay a sufficient amount of attention to these efforts. For example, the Minavtoprom (Ministry of Automobile Industry) did have a small effort in automated technological production tooling during the past five-year plan. In their plans for the 10th Five-Year Plan this ministry refused to continue even this modest activity. The technical ADS policy in this branch of industry remains unclear even though a world-wide experience shows that automation is also effective in automobile manufacturing.

Another difficulty follows from commonly used methods of planning and design. Time-honored traditions, training of personnel, methods of calculation and of design documentation are all oriented toward manual operations. Consequently, the mathematical models, the computation algorithms and the reference data are all simplified to a degree where they can be used manually. The very structure of planning and design organizations is slanted toward manual operations, including tiresome procedures used for coordination of engineering solutions put out by various subdivisions. Therefore, the implementation of ADS in various branches of the economy will require extensive, well organized and systematic efforts in development and assimilation of advanced methods of design, mathematical models, computation algorithms and reference data.

At the same time one must not forget that the design methods, the extensive manufacturing experience, the norms and the standards have all been accumulated gradually and represent the results of intensive labors of an entire army of engineers and scientists. The best of these practices should be preserved and improved as a part of ADS. An interesting development of this type of work can be found, for example, in the efforts of the USSR Ministry of Coal Industry. Using ADS planning methods, the main institute of the "Tsentrgiproshakht" branch consolidated and approved for this ministry the methods and the algorithms for basic engineering calculations even prior to introduction of high-capacity computers. These methods unify the long experience gained in design of coal mines, open pits and enrichment plants. Now, when the institutes of this industry are in the process of devising specific systems, the requirements of capacity, technical means, forms and volume of programs and information required by ADS become clear. An analogous experience has been accumulated by the USSR Gosstroy, the machine building industry and other ministries. Therefore, excuses which cite the lack of high-capacity computers as the basic reason for delaying work on ADS development cannot be accepted. It is first necessary to complete hard organizational and methodological tasks.

One should not avoid mentioning the fact that the number of our domestic high-capacity computers and the amount of peripheral equipment are still small. The demand for alphanumeric displays, plotters and magnetic disc storage equipment also remains largely unsatisfied.

Difficulties related to technical implementation of ADS cannot be solved by simply increasing the production of high-capacity (and high cost) digital computers. Design automation cannot work without computer systems whose structure and functions differ substantially from those found in our present computing centers. Here we should first of all mention the various analog-to-digital converter complexes. It is known that such complexes will enable one to solve, at a relatively modest cost, mathematical modeling problems whose complexity is beyond the capabilities of even high-capacity digital machines. Series production of such devices, however, has not yet been scheduled.

Design automation is one of the most important national tasks and a factor which largely determines the technological level, the quality and the effectiveness of industry and construction for many years ahead, i.e., it corresponds most fully to directives of the 25th Party Congress. It is time to begin practical design of such systems and to incorporate them into our industry.

9068
CSO: 1870

'ROBOTS-77' INTERNATIONAL EXHIBIT OPENS IN MOSCOW

Moscow PRAVDA in Russian 23 Feb 77 p 6

[Article by N. Korshunova, "The Professions of Robots"]

[Text] Yesterday, the year's first international exhibition, "Robots-77," opened in Moscow's Sokol'niki Park. More than 80 foreign firms and organizations from 14 countries and West Berlin are participating.

You will not see amongst the exhibits which have arrived at Sokol'niki for inspection the familiar concept of robots with photocells for eyes, antennae for ears and mechanical walking men which can manipulate their arms and talk. The most complex and contemporary industrial manipulators, automatons and equipment used in the casting, forge and pressing, welding and paint and lacquer industries are on the display stands. Today's robots are first and foremost tireless and industrious workers. One can find them in the most diverse sectors of industry. Frequently they even labor in conditions inaccessible and harmful to man.

We examine with G. Fritsche, the technical director of the GDR exposition, the metal-working machine tools set out in a row. A computer exercises control over them from the grasping of the half-finished work pieces to the output of the finished products. An electronic computer selects the processing mode of the component. The machine tool itself engages the necessary instruments in a special bin and changes them for a variety of operations.

"With the assistance of the electronic brain," says G. Fritsche, "It is possible to control 80 machines simultaneously. An entire plant!"

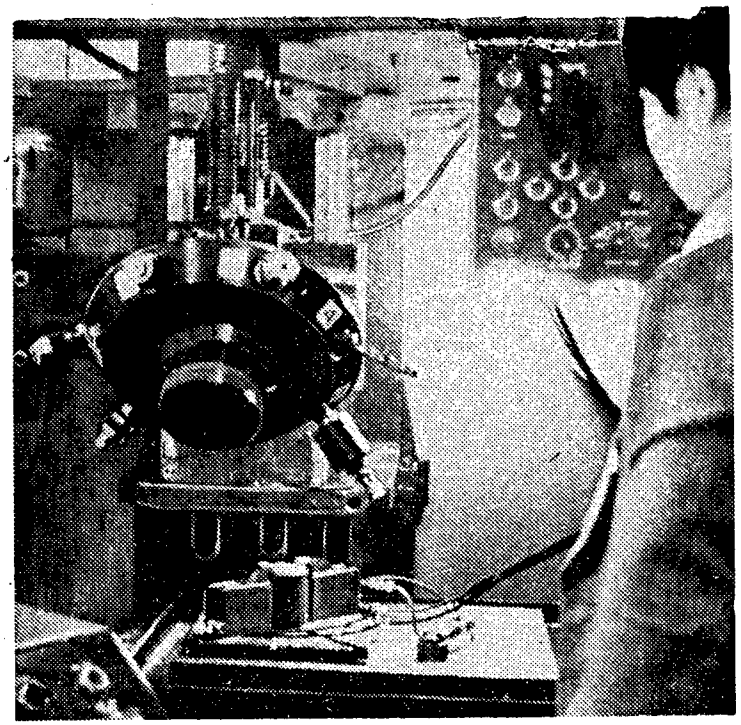
For the second time Japanese industry is acquainting Soviet specialists with its own robots.

"To this show," announces the exposition's general director, I. Takeda, "we have brought the developments of six firms. We think that the automated technical line for welding truck cabs will attract attention. This year the Toko Trading Firm will begin supplying equipment from this line under contract to the Motor Vehicle Plant imeni Likhachev."

Having extended a long "arm" into the "fingers" of which are installed a paint spraying device, a robot painter demonstrates its skill. The Japanese specialists are showing it abroad for the first time. The "Fanuk" robot is notable for its significant economy and efficiency as it automatically stacks and breaks down stock, changes instruments and removes shavings.

Various machines with programmed controls are manufactured by Hungarian industry with extnesive participation by CEMA member nations. The most noteworthy of their models can be seen at Sokol'niki. Bulgarian enterprises are displaying interesting industrial manipulators. The manipulator 6SN, a computer-controlled robot created by American engineers, has been endowed with extraordinary skill, maneuverability, ease of movement and power. The Swiss have brought for inspection a semiautomatic device for sharpening hobbing cutters. An 8-spindle automaton with a loading attachment bears an FRG stamp, and a multi-armed assembly robot that of Italy. One just cannot dexcribe all the exhibits.

So the parade of robots has begun. Specialists will be able to become acquainted with the latest achievements of the newest branch of contemporary technology.



One of the sections of the exhibit.

9082
CSO: 1870

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

AUTOMATIC CONTROL SYSTEMS IN FARMING BARELY STARTED

Moscow SEL'SKAYA ZHIZN' in Russian 13 Mar 77, p 2

[Article by R. Isanchurin, director of the dispatcherization laboratory of the All-Union Scientific Research Institute of Agricultural Mechanization and candidate of engineering sciences: "Moving Toward Automatic Control Systems"]

[Text] As agriculture advances, as it passes over into production-line forms and work methods, improving operational control of farming processes grows in importance. We can single out four stages in this transition. First, a stage in which a ramified dispatcher service is set up, relying on radio and telegraph. In the second stage there is introduced a system of operational control of production; it is founded on direct-observation, mathematical methods of solution. Stage three uses computers in operational control. An automatic system of operational control (ACOC) comes into play in stage four; it matches the demands of integrated, automated, programed production.

Nowadays interest centers thus far on progress in the first stage of operational control of farming: full dispatcherization. Admittedly, developing and introducing the dispatcher service into our country's sovkhozes and kolkhozes began back in the sixties. Today the service is operating in nearly 10,000 farms. It is being introduced usually with the assistance of scientific centers. For one, the collective of the SibIME is dispatcherizing kolkhozes and sovkhozes in Siberia and the Altay; the VNIPTIMESKh is helping farms dispatcherize in Rostovskaya, Volgogradskaya, Lipetskaya and Voronezhskaya oblasts; the UNIIMESKh--farms in the Ukraine; the TsNIIMESKh [Central Scientific Research Institute of Rural Mechanization and Electrification of the USSR Non-Black Soil Belt]--kolkhozes and sovkhozes in Belorussia; the VNISKhT--farms in the RSFSR; and the KazNIIMESKh--Kazakhstan farms. This is gratifying, since only in cooperation with science can this vital statewide problem be solved.

The dispatcher service was found to make farming much more efficient. For example, in Saratovskaya oblast farms dispatcherization meant 10-15 percent higher productivity for the machine-tractor sets and 25-30 percent shorter downtimes. In Tselinogradskaya and Kustanayskaya oblasts the performance

indicators of the machinery and tractor park rose 20-25 percent in farms introducing the dispatcher service. In Ukrainian SSR kolkhozes, helped by the dispatcher service, specialists increased the volume of useful working time from 45 to 77 percent. This was true also of all other farms where the new form of operational control of farming found wide acceptance. Costs in organizing the dispatcher service are recovered in one and a half to two years. We must grant that this period is very short.

Still, the effort demands that qualified personnel work in the farms, that the dispatcher service is fully staffed with cadre and that there are sets of office equipment and communication units. Generally, everything that makes for high efficiency of the dispatcher service.

But these conditions are still unattainable for most kolkhozes and sovkhozes. For example, our survey in Belorussia revealed that only 2 percent of farms bringing in the dispatcher service have a full staff, while 74 percent of the farms have only a dispatcher. Office equipment is found in only 7 percent of the kolkhozes and sovkhozes. In 42 percent of farms the dispatcher service furnishes only operational communication and in 40 percent--the collection of operational information and monitoring of equipment use. And in a mere 18 percent of the kolkhozes and sovkhozes the chief dispatchers are deputy chiefs for operational control of farming and do all the functions of the dispatcher service.

This five-year plan period many thousands of farms in the country are to be dispatcherized. Calculations tell us that agriculture will have to be given about 2000 sets of dispatcher office equipment, a variety of equipment panels and more than 20,000 radios. Each year no fewer than 4000 dispatchers and 2000 communication-technicians have to be graduated from training centers. Quite plainly, these tempos and scales of dispatcherization can be achieved only with new, up-to-date forms and methods of organizing farming and factory production. Plus, naturally, genuine help by scientific organizations.

Success in bringing the dispatcher service to the countryside would be helped along in no small measure by organizing centralized economic cost-accounting oblast or interrayon project-installation organizations, transferring to them all funds for equipment and communication units. For the normal running of dispatcher services, there is possibly the need to organize oblast or interrayon workshops in maintenance and repair. Positive experience in operating these workshops was gained, for example, in Stavropol'skiy Kray.

In some of the country's leading farms with a high level of mechanization, forms and methods of the second stage in improving operational control were introduced. The technical arsenal of the dispatcher service here was augmented by a plotting table for network simulation of farming, a set of punched cards for data-recording and a sector for manual processing of operational information, as well as a Bystritsa accounting machine and operational forms.

The staff of the dispatcher service includes an operator; using network methods of planning and control based on this equipment, he makes calculations on the

preparation and justification of operational decisions. These decisions are then confirmed by the chief specialists on the farm and are acted on by the head dispatcher.

The second stage in improving operational control was tested in roughly 200 farms of several zones in the country. At this stage of development, operational control of farming was found to be much improving.

Tomorrow in farming is programed farming and therefore we face the job of developing the right form of the third stage of operational control. Several of the country's institutes already investigate problems in automatic control systems in farming. At the same time, a large group of institutes are programing crop levels. Today all studies are at a point where they are beginning to be approved down on the farm. So an operational control service must be developed that would merge the scattered parts of programed farming.

It appears that the automatic system of operational control will be the tool with which, down on the farm, we can realize the great potentialities of automated farming.

10123
CSO: 1870

CONFLICT BETWEEN COMPUTER DESIGN BUREAU AND ITS INSTITUTE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Mar 77 p 2

[Article by A. Valentinov, Special Correspondent: "At the Crossroads"]

[Text] The reasons why there is a conflict of interest between the Novocherkassk Polytechnical Institute and its Special Design Bureau.

First the deputy director was fired. Then a department head was fired. In their footsteps, two chiefs of laboratories handed in applications "at their own request." The tiny stream of dismissals gradually spread, drawing into its flow even ordinary engineers, laboratory assistants and workers. In 1976 tens of individuals resigned from the Special Design Bureau for Means of Automation and Technical Cybernetics (OKB SATK) of the Novocherkassk Polytechnical Institute. Several of them did not simply leave, but "having slammed the door" wrote to the Party City Committee, to the Party Committee of the Institute, and to the newspapers. And in each letter they demanded an investigation, corrective action, and that the leaders of the OKB be punished.

Jumping ahead, I will speak of the paradoxical conclusion that I reached in investigating the complaints. Strange as it may seem, both the resignations and the multitude of letters turned out to be the result of a favorable process which has been taking place within the confines of the OKB, although it is not lacking keen opposition.

In order to investigate this paradoxical situation, we will look back a few years. The OKB SATK was organized during the last 5-year plan on the base of one of the Institute's branch [of industry] laboratories. Having created it, the Institute and the Ministry of Higher Education of the RSFSR intended to link academic research with production.

"And this is just how the leaders of the Institute say our task," said the Director, who is also Chief Designer of the OKB, V. V. Mikhaylov. "And after that, a reappraisal of values began," he added.

"It began, as often happens, with the accounting department. Organizations which become economically self-supporting and begin to totally rely on revenues for work performed have to count costs quite precisely. And all at once the leaders of the OKB had to face the fact that there was nothing with which to pay the employees' wages, let alone any bonuses."

Director V. V. Mikhaylov gathered his comrades in arms and despondently asked, "How are we to continue to exist?" The associates had an answer ready. They should increase their agreements with enterprises, accelerate completion of projects, and bring to fruition only those ideas of the Institute's scientists which are being sought by a customer -- in this particular instance, by a factory. And this was immediately interpreted as being in the best interests of the OKB. The first of these contracts with the enterprises brought the OKB this dilemma: How were they to get their developments adopted? It was no problem to build a device; no problem to prepare a working model and test it. The scientists' work justifies itself only when someone takes a working model and from it builds a group of devices and markets them. But who? Very quickly the OKB realized that they had no one to produce their instruments. There was not a single factory which would take it upon itself to produce a consignment of 30, 50, up to 100 special-purpose devices intended for control or support of a specific technological process. And the OKB specialized in just such devices.

Again they came up with the only acceptable solution. They would manufacture the instruments at their own experimental facility. However opportune this decision turned out to be, it nevertheless points up just how great a stream of orders had gushed toward the OKB from the enterprises. And each order was backed by a cash deposit. Enterprises selected the OKB's equipment and instruments, and money for the construction of production facilities. In the course of three years there were three buildings erected. At the same time, the Institute, despite an acute requirement for space, could not build even one. Admittedly the OKB had begun to donate a reasonable portion of its profits to the Institute's treasury.

The OKB had begun to flourish. Enterprises bought the instruments like hotcakes "still warm from the oven." The need for the instruments was great enough that right at first they were delivered to the factory shops without precision measuring equipment certification if only they could satisfy production requirements.

And then the leadership of the design bureau was called before the Party Commission of the Institute.

Sometime later, the Secretary of the Institute's Party Commission, A. G. Nikitenko, told me with a sign, "The OKB had, in general, separated itself from our affairs. And when it did participate, it was only to the extent that it was advantageous to the bureau. It was as if they had been formed not for the Institute's sake, but we for their's. Cooperation with the faculty now takes the following form, "If you want to work on those themes which are useful to us (in the OKB), fine: if not -- forget it." And it's the same as with the students...No, at first glance everything would seem to be in order. Students work in the OKB on thesis projects and sit in on conferences. But this is all

theatrics. They are extremely irregular and without a clearcut plan. And regularly they use the students here as manual laborers -- soldering, drilling, riveting. Therefore, each year some 150 students undergo practical training here. More than that are just not needed by the OKB. And here is the result. In a year, the OKB, employing some 700 personnel, stretches this to 8000 hours of instruction. This is as much as for a chair with 10 or 12 people."

"It's nothing at all like that," the OKB Director, V. V. Mikhajylov, assured me two hours later. "The root of our disagreement with the Institute is that some people persist in considering the OKB as having been founded for the Institute. Consequently, we are supposed to accommodate our activity to an established tradition of conducting scientific research. And this tradition goes back to the last century. "Having concentrated the whole cycle from design to output of an industrial consignment in its hands, the OKB has been forced to take the next inevitable step to bind all the workers to a strict technological regimen. These steps have given rise to a chain reaction of conflicts. "A few workers have come to the OKB dreaming of carrying out scientific research. And in their opinion, this is a quiet liesurely pursuit with lengthy reflections, experiments, and without stipulations of explicit timeframes. Really, how can there be deadlines for new discoveries? Perhaps this comes later when the facts which were uncovered begin to come together in the traditional dissertation." "However, the employment contract clearly limits all stages of creative work, whether one likes it or not. Those who don't agree are free to leave." It figures that this process could not flow smoothly. The situation was aggravated by the fact that the experimental production facility of the OKB, having been established to produce working models, was not set up to handle the quantities of work which had sprung up. And the employees often had to take soldering irons or drills or saws in hand to assure output of finished products. Obviously a few of them would complain that they had not come here to solder. But rather to pursue science and write theses.

It's obvious that this system was not so much rigid as it was unaccustomed, for during the last 5-year plan, two monographs and 98 articles in the central press were published by OKB employees. Six collections of scientific research were issued. Sixty-five authorship certificates for inventions were issued and 19 employees defended candidate's dissertations. During the same time period, on the other hand, 2000 instruments and automations systems built at the OKB returned 27 million rubles in savings to the economy.

It stands to reason that only enthusiastic support could achieve such success, and there was enough of that in the OKB. They accustomed themselves to an insane pace of work, to crowded production facilities, to discomforts, Others left. These were those who either would not or could not create according to a schedule. Their disappointment and shame spurted out in the complaints. However, not only former OKB employees were complaining. So also were members of the faculty upon whom just such demands had been made.

How were they to address this at the school? We will quote one point from the Institute's Party Commission's decision regarding the OKB activities.

"We consider that the OKB SATK collective's task is, together with the collectives of the related faculties and chairs, to by any means possible enhance the quality of the education of highly qualified specialists for the economy on the basis of an integral blending of the learning process with the scientific production activity of the OKB SATK." I wanted to find out just what they had in mind with the "basis of integral blending." It turned out that in the eyes of the Institute's leadership, the OKB must "make room" so that more students could study in those same methods as before.

I asked the Secretary of the Institute's Party Committee, A. G. Nikitenko, this question, "Is not the OKB SATK a step forward along the road of unifying scholastic science with production?"

"Undoubtedly."

"And the learning process in its present form?"

"Certainly. It requires modernization," agreed A. G. Nikitenko. Why then shouldn't the Institute take the first step to merge in some manner the educational process with the OKB's activity? For instance, it could transfer part of the laboratory work to the OKB, which has significantly more modern facilities and instruments than the school does. And they could be constructing not just the traditional training circuits, but actual instruments.

"We are ready for this," said the OKB Director, V. V. Mikhajylov.

"Right now we are organizing a laboratory for control devices. Let the students work on their installation and assembly under the supervision of our specialists."

Let us summarize. The conflict which arose within the confines of the Novocherkassk OKB SATK has far from local significance.

The Ministry for Higher Education of the RSFSR has organized 15 additional OKB's at various institutes. Sooner or later, they will inevitably come up against the same problems as in Novocherkassk, if they have not already done so. Furthermore, the Ministry in the future is going to establish combined educational-scientific-production associations on the basis of the Novocherkassk example.

It's easy to suppose that if this example is multiplied on a large scale, its problems will be intensified at the same time. Are they ready to resolve them at the RSFSR Ministry of Higher Education?

The Director of the OKB, V. V. Mikhajylov says, "Educational-scientific-production associations such as ours lead the progress of science and technology. But having brought us to life, neither the Ministry nor the leadership of the Institute could predict that our furious activity would so quickly lead to the acute disagreement with now established higher educational structures."

Obviously the OKB director is correct. Everything new and progressive, which life gives rise to, sooner or later demands a specific reorganization of the old with which it comes into contact. And the earlier that the Ministry of Higher Education of the RSFSR correspondingly corrects the old, the more effective will be developed the entire educational-scientific-production complex.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SIBERIAN SCIENTISTS TO BAYKAL - AMUR HIGHWAY

Moscow STROITEL'NAYA GAZETA in Russian 23 Feb 77 p 2

[Text] The tie between science and industry improves and strengthens. In the recent resolution of the CC CPSU regarding the activity of the Siberian branch of the USSR Academy of Sciences the great influence of this scientific institution on the development of industrial potential was discussed. The close connection of science and practice is explained, at the request of the correspondent of STROITEL'NAYA GAZETA, by Academician A. G. Aganbegyan, Director of the Institute of Economics and Organization of Industrial Production at the Siberian branch of the USSR Academy of Sciences.

"The policy of the Party and Government concerning development of industrial potential in the East of our country is brought into effect with the help of large-scale regional programs," Aganbegyan said. "In particular, a great role was played by the programs constructing the Ural-Kuznetsk complex, industrial and power complexes of the Angara - Yenisey region and the exploitation of oil and gas rich deposits in Western Siberia. And today mastering of the Baykal - Amur Highway zone is on the agenda. This zone covers the territory of one and a half million square kilometers of tremendous natural wealth. The task of the scientists now is to issue recommendations for order of priority for the developing of these resources to determine the volume of these resources and their mutual relations. Important is also the harmonization of intensive industrial development with environmental protection and the solution of social questions: after all, in the zone of the Baykal - Amur Highway zone more than a million people will live.

Another area of problems is connected with methods of development of the new region. It consists of perfecting the industrial ways of construction, application of the most advanced technology, high concentration of production and correct division of labor between the North and the South. In order to solve these questions successfully we worked out a planning model for the construction of Baykal - Amur Highway which connects dates of completion of the individual sections with planning of capital investments. We designed a model to determine directions of economic use of the Highway zone.

The most important task of our collective is, as far as possible, to coordinate the efforts of various institutes involved in the problems of the Baykal - Amur Highway. We are in a specially close coordination with the Institutes of Geology and Geophysics, and of Economics of the Siberian branch of the USSR Academy of Sciences, VASKhNIL, USSR Academy of Medical Sciences, Institute of Geography of Siberia and the Far East, the Far Eastern Scientific Center and the Central Scientific-Research Institute of Economics of the Gosplan RSFSR. At the initiative of Siberian scientists, the first all-union conference on problems of the Baykal - Amur Highway took place in 1975 in Chita. A second conference will take place in autumn of this year in Blagoveshchensk. We have already prepared an extensive report about the scientific foundations for the complex program of the Baykal - Amur Highway Zone's economic development.

The successful realization of indicated programs of development of industrial potentials is in many respects dependent on creating of strong construction basis. Therefore we attach special attention to the solution to this problem. The starting point for us is the consideration that the contemporary construction industry should maximally facilitate the labor of the builders." In conclusion A. G. Aganbegyan said: "We think that we, scientists, can give much more help to the developers of Siberia and the Far East. And it is our duty to do this."

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

USSR ACADEMY OF SCIENCES MEETS

Moscow PRAVDA in Russian 3 Mar 77 p 2

[Text] On 2 March, the USSR Academy of Sciences opened its annual meeting in the Moscow House of Scientists. The most important results, obtained for the current period in the field of natural and social sciences, problems of increasing the effectiveness of scientific research, growth of the role of science in the solution of problems of building communism--these are the questions that are in the center of attention of the Soviet scientists gathered for their traditional meeting in the year of the 60th anniversary of the Great October Revolution.

The meeting was opened by the president of the USSR Academy of Sciences, Academician A. P. Aleksandrov. "We live in the 60th year of the existence of our state," he said. During the years after the Great October Socialist Revolution, our country has achieved outstanding success in the development of economy, science and culture. Fundamental social and political changes have taken place in the whole world during this time. The international prestige of the Soviet Union has grown immensely as a result of its foreign policy measures directed at the peaceful co-existence of countries with different socialist systems; the development of international cooperation; the preservation and strengthening of peace, in which all progressive mankind is interested. The USSR Academy of Sciences is actively preparing for this important event. The scientists of the USSR Academy of Sciences, academies of sciences of the union republics, and of the universities, have completed a number of works in the fields of natural and social sciences, which are of the great importance to technical and scientific progress, and the realization of the decisions of the 25th CPSU Congress.

The president covered in detail the basic directions of fundamental research conducted by the institutions of the academy. He described the important research in the field of social sciences, specifically those performed in the institutions of the academy for the 60th anniversary of the Great October. He especially emphasized the importance of the scientific work accomplished under the guidance of Academician B. N. Ponomarev, "Mezhdunarodnoye rabocheye dvizheniye (voprosy istorii i teorii)" [International Worker's

Movement (Questions of History and Theory)]. Also named in connection with this were the 6th and 7th volumes of "Istoriya vtoroy mirovoy vpyny" [History of the Second World War], the work "Rabochiy Klass-vedushehaya sila Oktyabr'-skoy sotsialisticheskoy revolyutsii" [Working Class--The Leading Force of the October Socialist Revolution], "Ekonomicheskiye problemy razvitogo sotsializma" [Economic Problems of Developed Socialism], four volumes of "Istoriya vsemirnoy literatury" [History of World Literature], and others. A. P. Aleksandrov pointed out the important work being carried out by the scientists-economists regarding the problems of planning and distribution of productive forces of the country, and regarding the economic problems of the development of fuel-energy complex, including the international aspects of this problem.

He dwelled on the questions of distribution of productive forces of the country in conformity with optimum use of the power resources and scientific research connected with it. The president told about a big project being carried out by the scientists of the academy with the production specialists in creating semiconductor current transformers on the basis of which high-power lines for the electrical transmission of direct current will be constructed.

Describing the work in the field of earth sciences, A. P. Aleksandrov gave a high rating to the research in petroleum geology, metallogenesis and other areas and pointed out the importance of effective methods being worked out by the scientists of a more complete extraction of petroleum out of the stratum. He also stressed the importance of research being carried out at the present time, on problems of extracting petroleum and gas from the shelves of oceans and seas. Talking about the important accomplishments in identifying various precursors of big earthquakes, the academician posed the problem of increasing the accuracy of earthquake forecasting.

Among the accomplishments in the fields of chemical and biological sciences, A. P. Aleksandrov named research in deciphering the structure of a series of proteins, nucleic acids and other biopolymers. He rated highly the works of scientists of the Siberian Department in developing a new variety of wheat, "Novosibirskaya 67," and also the proposal for using high-current electron accelerators for disinfestation of grain in elevators. The president especially stressed the importance and effectiveness of cooperation of academy institutes with scientific research establishments and enterprises of the Ministry of the Chemical Industry on different problems of chemistry and chemical technology. He pointed out the big job being carried out jointly with a number of ministries on the application of pesticides in agriculture as well as the development of biological means of plant protection.

Noting that there were big successes in the field of physics, mechanics and mathematics, A. P. Aleksandrov dwelled on the problems of improving computer equipment and, in this connection, noted the necessity of strengthening the influence of the USSR Academy of Sciences upon the development of this important direction of scientific-technical progress.

In conclusion, the academician rated highly the results of a meeting held recently of presidents of the academies of sciences of socialist countries and the agreement reached by them regarding their plans of working together in social and natural sciences and in production of instruments and means of automating scientific research.

A storm of applause by members of the meeting greeted the announcement of the president of the USSR Academy of Sciences, A. P. Aleksandrov, of awarding faithful Marxist-Leninist comrade L. I. Brezhnev, general secretary of the Communist Party of the CPSU, the highest award of the USSR Academy of Sciences in the field of socialist science--gold medal imeni Karl Marx. Comrade L. I. Brezhnev was honored with this award because of his valuable contribution to the development of Marxist-Leninist theory, for the solution of pressing problems of developed socialism, the strategy of worldwide historical struggle for communist ideals, for peace in the whole world.

At the general annual meeting of the USSR Academy of Sciences the highest award of the Academy in the field of natural sciences for the year of 1976 --gold medals imeni M. V. Lomonosov--were awarded to Academician S. I. Vol'fkovich and Academician of the Academy of Sciences GDR German Klar. According to tradition, the Lomonosov gold medal laureates presented scientific reports.

Corresponding member of the USSR Academy of Sciences G. K. Skriabin gave a report on works honored by the USSR Academy of Sciences with gold medals and prizes honoring famous scientists. Also at the meeting, young scientists and students were presented with awards of the USSR Academy of Sciences.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

VACANCIES IN THE ESTONIAN ACADEMY OF SCIENCES

Tallin SOVETSKAYA ESTONIYA in Russian 6 Mar 77 p 1

[Announcement by Estonian SSR Academy of Sciences Presidium]

[Text] The Estonian SSR Academy of Sciences in accordance with the charter of the Academy announces that the following candidates have been nominated by scientific institutions and higher teaching institutions for vacancies in the Estonian SSR Academy of Sciences as announced on 28 November 1976:

Khizhnyakov, Vladimir Vasil'yevich, doctor of physico-mathematical sciences, senior scientific associate at the ESSR Academy of Sciences Institute of Physics, nominated by the council of the ESSR Academy of Science Physics Institute for the vacancy of corresponding member with a specialization in physics;

Khint, Iokhannes Aleksandrovich, doctor of technical sciences, first deputy director of the special design-technological office "Dezintegrator," nominated by the academic council of the special design-technological office "Dezintegrator" for the vacancy of corresponding member with a specialization in physics;

Aben Khillar Karlovich, doctor of technical sciences, acting director of the ESSR Academy of Sciences Institute of Cybernetics, nominated by the council of the ESSR Academy of Sciences Institute of Cybernetics for the vacancy of corresponding member with a specialization in mechanics;

Simm, Khelle Augustovna, doctor of biological sciences, professor, senior scientific associate at the ESSR Academy of Sciences Institute of Zoology and Botany, nominated by the council of the ESSR Academy of Sciences Institute of Zoology and Botany for the vacancy of corresponding member of the ESSR Academy of Sciences with a specialization in hydrobiology and hydrochemistry;

Raukas, Anto Viktorovich, doctor of geologo-mineralogical sciences, section head at the ESSR Academy of Sciences Institute of Geology, nominated by the council of the ESSR Academy of Sciences Institute of Geology for the vacancy of corresponding member with a specialization in geology;

Tarmisto, Vello Yuliusovich, doctor of economic sciences, director of the ESSR Academy of Sciences Institute of Economics, nominated by the council of the ESSR Academy of Sciences Institute of Economics for the vacancy of corresponding member of the ESSR Academy of Sciences with a specialization in economics;

Siylivask, Karl Karlovich, doctor of historical sciences, professor, director of the ESSR Academy of Sciences Institute of History, nominated by the council of the ESSR Academy of Sciences Institute of History for the vacancy of corresponding member of the ESSR Academy of Sciences with a specialization in USSR history;

Peegel', Yukhan Maksimovich, doctor of philological sciences, professor, instructor at the Tartu State University of the Estonian SSR, nominated by the council of the Tartu State University for the vacancy of corresponding member of the ESSR Academy of Sciences with a specialization in philology.

Presidium of the Estonian SSR
Academy of Sciences.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

MEETING OF THE KIRGIZ ACADEMY OF SCIENCES

Frunze SOVETSKAYA KIRGIZIYA in Russian 6 Mar 77 p 3

[Article: "Science--In the Service of the Five-Year Plan"]

[Text] The 25th Congress of the CPSU has concisely determined the tasks of science in the Tenth Five-Year Plan--to expand and deepen research on the laws of nature and society, to increase the contribution of scientists to the resolution of vital problems in the building of the material-technological base of communism and the growth of the well-being and culture of the people, in the formation of a communist world outlook on the part of workers. Confronting us is the task of assuring a persistent development of fundamental and applied research in the social, natural and technological sciences.

The scientists of Kirgiziya have marked the first year of the Tenth Five-Year Plan by new achievements in the development of science and in the efficiency of the utilization of science in the national economy of our republic. The chief headquarters of those scientists--the Academy of Sciences--has concentrated the efforts of scientific collectives on resolving the major and vital problems as well as increasing the theoretical and methodological level of research projects, as well as the training of a cadre of young specialists and the improvement in the structure of the scientific institutions.

The results of the scientific and scientific-administrative activity of the republic academy in 1976 and the tasks of Kirgiz scientists in the light of the decisions of the 25th Congress of the CPSU and the decree of the CC CPSU "On the 60th Anniversary of the Great October Socialist Revolution" were at the center of attention at the annual meeting of the Kirgiz SSR Academy of Sciences which took place on 25 March.

The meeting was opened by the president of the Kirgiz Academy of Sciences, corresponding member of the USSR Academy of Sciences,

K. K. Karakeyev. Presenting a report was the chief scientific secretary of the presidium of the Academy of Sciences of the republic, Academician O. D. Alimov.

As was noted at the meeting, involved in the resolution of problems confronting the science of Kirgiziya are more than 7,100 associates who include approximately two and a half thousand doctors and candidates of sciences. In the past year the collectives of the Academy of Sciences worked out 177 topics on 87 problems. Work has been completed on five topics and eight major divisions. Introduced into the national economy were 42 proposals from scientific institutions and 20 of them have already undergone experimental-industrial testing.

The scientists of the republic are confronted by much work. There is yet much to be done in order to have the achievements of science rapidly implemented not only in individual no matter how brilliant--experimental and exhibit models, but in thousands of new types of production items, beginning from unique machines and ending with everything that is connected with improving the living and labor conditions of the people. The practical implementation of new scientific ideas is a vital task of the day.

Speaking at the discussions were academicians of the Kirgiz SSR Academy of Sciences, M. M. Mirrakhimov, A. Altmyshbayev, N. I. Kazhar'yev, V. G. Yakovlev, and corresponding members of the Academy of Sciences, A. Altymyshev, K. Sulaymankulov, and others.

The scientists vowed that they would give all of their efforts, energy and creative inspiration to implementing the historic plans of the 25th Congress of the CPSU and greet in a worthy fashion the 60th anniversary of the Great October.

Corresponding members of the Kirgiz SSR Academy of Sciences were elected at the general meeting.

Participating in the work of the meeting were the first secretary of the Kirgiz Communist Party Central Committee, T. U. Usubaliyev, secretary of the Kirgiz Communist Party Central Committee, K. N. Kulmatov, deputy chairman of the Kirgiz SSR Council of Ministers, S. Begmatova, and first secretary of the Frunze Municipal Committee of the Party, K. M. Moldobayev.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

LATVIAN ACADEMY OF SCIENCES

Riga SOVETSKAYA LATVIYA in Russian 8 Mar 77 p 2

[Text] Decisions of the 25th congress of CP USSR to life!

The decisions of the 25th congress of the CP USSR and subsequent party documents regarding development of science, increasing its role in a communist construction, are the concrete and urgent program of action of party organizations and all communists within scientific institutions. Scientists of the Academy of Sciences of this republic have achieved considerably in the last five-year plan: they completed the research on 239 topics. More than 200 projects were introduced into industry leading to the economic savings of 90 million rubles.

Of course the achieved effects give, in no way, the right to be self-satisfied. The tasks of the 10th Five-Year Plan demand from the scientists even more intensified creative powers. As is mentioned in the party documents, the possibilities of sciences are not yet fully utilized. The CC CPSU recently examined the activity of the Siberian branch of the USSR Academy of Sciences and confronted the scientists with a number of concrete and important tasks realizations of which will promote increase of effectiveness of science and better introduction of scientific results into national economy. Great importance in this work is attached to improvement of the planning system and, in particular, development and use of complex programs.

Implementing the assignments set up by the Party, the presidium of the Academy of Sciences of this republic, the leaders of research institutes and party organizations are carrying out a great work in creating complex programs providing for, together with ministries, departments and plants, the elaboration of important scientific and technological problems in shorter times and introduction of achieved results into practice. At this point institutions of the Academy of Sciences have completed more than 20 such programs. Heads of institute and party organizations have one debt: to do all that is necessary for the successful realization. The efforts of the presidium of our Academy, leaders of research collectives and party organizations are directed to control of course of this work, to concentration of research in the main

sections, to increase responsibility for an assignment and to achieve the highest results by each worker.

One of the serious conditions for increasing the effectiveness of science and its influence on acceleration of scientific and technical progress is the further improvement of scientific activity of all institutes providing that this activity corresponds most fully to contemporary demands. Unfortunately, it also happens that individual scientific institutions having identical conditions do not always have the same results. Much depends on the novelty of a theme of research in the given institute and on the long-range importance of expected results considering tasks not only of today, but also of tomorrow. It also depends on the improvement of structure of research subdivisions that would guarantee a more effective concentration of strength and means for fulfilling the outlined research. And, of course, qualification of personnel and furnishing of an institute with research equipment and materials have a great importance.

Experience shows that where constant attention is being payed to these questions things are better and results are higher. For this as an example can serve the activity of Institute of Organic Synthesis. Results from this Institute are widely used in chemical and medical industries. In the Olayn plants of chemical reagents and chemical pharmacology, 35 - 40 percent of production is based on the research of the Institute. In pharmaceutical plants in Riga, on the other hand, this production is only one fourth of the entire volume. Therefore union ministries with interests in research of the Institute render it a considerable help in developing an experimental basis. General Secretary of the CC CPSU comrade L. I. Brezhnev in his speech to the leaders of academies of sciences of socialist countries said that sometimes research is carried out in some entirely peripheral and simply fruitless directions. Considering this, party organizations, communists and heads of research institutions of the Academy of Sciences of Latvian SSR are now organizing correction of plans of scientific research and determination of the most expedient arrangement of scientific personnel for the solution of problems which will show a substantial influence on the scientific and technical progress.

Agreements became one of the forms which today determine the cooperation between research collectives and production workers for a most expedient introduction of scientific achievements into the national economy. For example, the Institute of Physics and Energy and the Tallin Electrotechnology Plant imeni M. I. Kalinin concluded an agreement about cooperation during the 10th Five-Year Plan which envisages development and implementation of semi-conductor technology on the basis of the research done in the institute. Cooperation of A. Kirkhenshteyn Microbiology Institute and Livan Experimental Biochemical Plant is also confirmed by an agreement. Its main point is the cooperative work between scientists and production workers who invent and implement new technological processes of production of a new feed concentrate "lizin" and other products of microbic synthesis in use for feed rations at live-stock farms.

Lately also departmental laboratories in institutes came into being. They are organized at the expense of ministries and departments which have interests in the scientific research. Such a laboratory exists now at the Institute of Electronic and Computer Technology and serves for research of fast-acting means of data processing. Another laboratory is in the Physics Institute where the effect of magnetic field upon the growth of crystals is investigated. In the Institute of Wood Chemistry a collective of a laboratory is concerned with problems of synthesis of foam-urethane. Also the creation of joint groups of scientists and representatives of industrial fields, the wide information on achievements of sciences and their promotion on exhibitions of various kind in Riga, Moscow as well as abroad have to be mentioned. All these forms are but a part of a great and very complex initiative for the mobilization of collective effort of the Academy of Sciences of Latvian SSR for fulfillment of tasks of the Tenth Five-Year Plan.

Communists and all workers of the institutes are now carrying out a great organizing work in order to concentrate research potentials for completion of the agreement work which fall under socialist pleges by December 25, 1977. This will give the national economy 4 million 214 thousand rubles which is 380 thousand more than in the last year. At the beginning of this year, in a meeting of a party committee of the Academy and members of the presidium, possibilities of party organizations and collectives of institutes were examined with the conclusion that the above-plan work on the occasion of the 60th anniversary of the Great October will be fulfilled ahead of time.

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LATVIAN ACADEMY OF SCIENCES' MEETING

Riga SOVETSKAYA LATVIYA in Russian 25 Mar 77, p 2

/Text/ The general annual meeting of the Latvian Academy of Sciences convened 24 March in the Conference Hall of the many storied building of the Academy of Sciences of the Latvian SSR. Participants included directors and leading scientists of scientific research institutes and colleges, executives of ministries and departments and representatives of public organizations of the Latvian capitol.

Among those present were chairman of the Presidium of the Supreme Soviet of the Latvian SSR P.Ya. Strautmanis, chairman of the Council of Ministers of the Republic Yu. Ya. Ruben, secretary of the Central Committee of the Communist Party of the Latvian SSR I.A. Anderson, deputy chairman of the Council of Ministers of the Latvian SSR V.M. Krumin', deputy chairman of the Council of Ministers and chairman of the Gosplan of the Republic M.L. Raman.

Academician A.K. Malmeyster, Hero of Socialist Labor, President of the Academy of Sciences of the Latvian SSR, presented the opening address. "Scientists of the republic' he said, 'consider their most important task to be the successful fulfillment of Decrees of the 25th Party Congress of the CPSU which is advancing a grandiose program of economic and social development and improvement of the standard of living of the Soviet people. The collective of the academy is concentrating its efforts on basic research in the natural, technical and social sciences, giving special attention to the increase of effectiveness of scientific investigations and strengthening the association of science and production." This is now the major feature of Soviet science.

In his speech at the 16th Congress of Trade Unions, Secretary General of the Central Committee of the CPSU comrade L.I. Brezhnev emphasized that "at the center of economic policy is the struggle for effectiveness of national production, for high quality work in all regions and at all sectors of the national economy." This applies in full measure to scientists called upon to participate actively in the Communist construction.

In order to increase the effectiveness of research and reduce the periods of realization of their results, A.K. Malmeyster noted later, "the Academy of Sciences of the Latvian SSR started to organize scientific work on the basis of complex programs compiled jointly with enterprises of the national economy." Presently, there are more than 70 such programs, calculated for the Five-Year Plan. The academy is persistently attempting to increase its contribution to the struggle for technical progress and the increase of the national well-being. The institutes of organic synthesis, physico-energetics, mechanics of polymers, microbiology and several other institutes have become famous in our country and abroad. This is due to the work of many. Latvian scientists should increase their efforts, their creative energy in order to actualize honorably the tasks facing us.

The academy president expressed confidence that its collective will fulfill the scientific plans of the 2d year of the 10th Five-Year Plan at a high level and will worthily meet the 60th anniversary of the Great October Socialist Revolution.

Chief Scientific Secretary of the Presidium of the Academy of Sciences of the Latvian SSR V.P. Samson, Hero of the Soviet Union, described the basic results of the activity at the Academy for 1976. Under conditions of developed socialism, he noted, scientific discoveries are creating the preconditions for the rapid increase of national production. It is the duty of scientists to contribute, in every way possible, to the increase of labor productivity and improvement of quality manufactures produced. Improvement of obsolete industrial processes cannot provide the optimal solution to problems. There must be established fundamentally new technological schemes which are based on basic research. The major perspective of progress is revealed only by the main trends of science.

The Communist Party and the Soviet government display daily concern about science and its needs. Problems faced by science were discussed at the 25th Party Congress. Problems of the 10th Five-Year Plan were included in this discussion. Many Party documents emphasize the vast significance of science in the life of socialist society. Secretary General of the Central Committee of the CPSU L.I. Brezhnev turned attention to this again in his address on the recent meeting with directors of academies of sciences

of socialist countries. He said, "we consider it necessary, while encouraging the development of basic science in every possible way, to be concerned with the inherent association of it with applied studies and the acceleration of the introduction of scientific discoveries into the national economy. This is a most important task."

He said, in his speech, that the generally accepted center of Soviet science is the Academy of Sciences of the USSR. At the same time, the role of peripheral and national scientific institutions has grown significantly. Academies of sciences of union republics have established major regional scientific centers at which original trends in research are being developed on the basis of pooled scientific schools.

Most forms of widely acknowledged creative associations of scientists of the Ukraine and production are being used successfully in Soviet Latvia. These include contracts between scientific institutions and industrial unions or enterprises concerning socialist cooperation and the organization of scientific and technical complexes headed by major institutes. We must emphasize that these complexes completely justify their purpose. Laboratory design bureau - experimental plant - mass production -- this is the most efficient method of putting into practice the latest scientific achievements. The first in our republic to follow this path was the Order of the Red Banner Institute of Organic Synthesis. The Institute of Microbiology imeni A. Kirkhenshteyn, the Physico-Energetic Institute and some other institutes followed its example.

In 1976, collectives of academies presented more than 40 new proposals in answer to inquiries concerning technical progress. In addition to this, mastering of many previous scientific developments has been completed. For example, savings of hundreds of 1000's of rubles comes from a technology of refining semiconductor materials (Physico-Energetic Institute) introduced at one of the enterprises.

All of its traditional trends of research are reflected in the activity of the academy. They also underwent especially wide development, including development of magnetic hydrodynamics, theory of automatic machines, mechanics of polymers and synthesis of physiologically active compounds. The most promising theses of scientific research were determined in these and other areas. However, even now, at the end of the first year of the 10th Five-Year Plan, each scientific collective actually has achieved significant theoretical and practical results. Physicists have observed (experimentally) a new optical effect in activated alkali-haloid crystal which makes possible their use in lasers and light intensifiers. Specialists in the mechanics of polymers have proposed a method involving the use of a non-uniform magnetic field which increases the strength of so-called composite materials. We have many such examples.

In 1976, the Central Committee of the CPSU and the Council of Ministers SSR issued a resolution concerning measures for further increase of the effectiveness of agricultural science and the strengthening of its connection with production. Now, in view of this, academies of sciences of union republics and the VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/ resolved to develop an extensive program of joint research in molecular biology, genetics, physiology, biochemistry and other basic sciences concerning plants and animals and also concerning problems of environmental protection, rational use of land and water resources, increase of soil fertility and control of soil erosion.

"We,' said the speaker, 'are increasing investigations in these directions, begun in previous years. In the 10th Five-Year Plan, scientists of the academy recommended 38 developments for use in agriculture with a total economic effect of nearly 100 million rubles."

The Institute of Economics laid methodical and methodological bases of organization and functioning of agrarian-industrial associations in the Latvian SSR. The first of these, as is well known, was formed in 1976 in Talsinskiy Rayon.

In the period under review, scientists of separate social sciences of the academy were occupied with many vital problems of economics, history, language and literature.

In the past 10 years, capital investments of the Academy of Sciences of the Latvian SSR more than doubled. Many unique techniques were acquired. The EVM /electronic computer/ pool was replenished. All of this compelled the consideration of means for increasing the returns on expenditures. The academy, it was indicated in the speech, was one of the first to begin development of a centralized, collective system of use of computer technique for automation of experiments and analysis of data obtained. This system serves 5 institutes in Riga Academy City.

"We must constantly be concerned with the training and advanced training of scientific personnel," said V.P. Samson. "It is impossible to expect significant scientific achievements in locations where there are no science schools, headed by eminent scientists. We must emphasize that, in the last 10 years, 75 persons defended doctoral dissertations in the academy, more than twice the number defended in the preceding 10 years. However, this does not justify complacency. As science develops, the demands made upon scientists increases abruptly."

The speaker also noted some serious deficiencies in the activity of the academy, which are cause for concern. Not all of the scientific efforts and material resources are concentrated on work in the most important

long-term trends. Prospecting studies, basic research and applied research are not always properly combined. We must mention that we still are not utilizing completely those opportunities which scientific and technical complexes make available. It is necessary to strengthen and expand existing contacts with institutes of higher education and sectoral scientific institutions. There is need for continuing improvement in the operation of informational and economic services of the institutes. These are serious organizational problems which require immediate solutions.

Institutions of the academy are now engaged in development of extensive competition dedicated to the approaching national holiday -- the 60th anniversary of the October Socialist Revolution. In honor of this historic date, there are extensive plans for publication of studies, publishing of articles, preparation and presentation of exhibits which demonstrate the progress of Soviet Latvia in science. "We' concluded the speaker, 'are exerting all of our efforts in order to celebrate the 60th anniversary of the October Revolution with new significant successes."

Corresponding members of the academy A.K. Viron and V.O. Miller, Doctor of Philological Sciences A.Ya. Blinkena, Doctor of Chemical Sciences R.Ya. Karklin', and candidate of biological sciences G.P. Andrushaytis, discussed the speech.

Two scientific reports were presented at the annual, general meeting of the academy. Corresponding Member of the Academy of Sciences of the Latvian SSR, Yu. S. Urzhumtsev spoke on the topic "Prognostics of Deformatability of Polymers." Doctor of Economical Sciences A.A. Kalnin'sh discussed improvement of management of inter-economic cooperation and agro-industrial integration under the conditions of the republic.

A group of scientists attending the meeting were awarded the prize imeni "Outstanding Scientist of the Latvian SSR" and the "Prize of the Presidium of the Academy."

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UZBEK ACADEMY OF SCIENCES MEETS

Tashkent PRAVDA VOSTOKA in Russian 26 Mar 77 p 2

[Article: "Main Lines of Scientific Inquiry"]

[Text] The annual meeting of the Uzbek SSR Academy of Sciences was held in Tashkent on 25 March. Scientists of the republic gathered for the traditional meeting in order to sum up the results of work which had been completed and to determine tasks with respect to fulfilling the plan of scientific research for the present year and to adopt increased socialist pledges for the purpose of welcoming in a worthy fashion the 60th anniversary of the Great October.

The annual meeting was opened by the president of the Academy of Sciences, academician, Hero of Socialist Labor, A. S. Sadykov. He dwelt in his speech on the priority tasks for the republic's scientists.

Presenting a report was the chief scientific secretary of the Academy presidium, corresponding member of the Uzbekistan Academy of Sciences, Kh. N. Baymukhamedov.

It was noted in the report and in statements by the meeting's participants that the past year was a fruitful one for the scientists of the republic. Guided by the decisions of the 25th Congress of the CPSU, the collectives of institutions and organizations of the Academy completed work with respect to a number of directions in contemporary science and with respect to raising the efficiency and quality of scientific research.

Investigations have been completed in the history of the working class and the kolkhoz peasantry of the republic and with respect to the experience of state construction and the international indoctrination of workers. Works have been prepared which offer a decisive rebuke to bourgeois falsifiers of history and demonstrate, on the basis of specific examples, striking examples which have been brought to the Uzbek land by the Soviet system and the persistent growth in the level

of the economy and the culture of the republic as well as the wisdom and farsightedness of the Leninist nationality policy of the communist party.

Successes have been achieved in the area of the natural and technological sciences. Worked out and implemented within the Academy, together with the Gosplan of the republic, and together with ministerial, industrial and scientific-research institutes as well as VUZ's were 11 complex programs in research on the most important national economic problems.

The economic results obtained from the introduction of scientific recommendations that were prepared within the Academy institutions has come to tens of millions of rubles last year. There has also been an increase in the number of economic contracts with enterprises and organizations. The scientific collectives have been concentrating their efforts and means primarily in research on a basic topic which has been approved by the USSR Council of Ministers State Committee on Science and Technology, the USSR Academy of Sciences, and directives by the republic organs.

A great deal of attention in the report and in statements made at the meeting was given to the non-utilized reserves and ways for further improving the activity of all academy subdivisions. Participating in the discussions were academicians of the Uzbek SSR Academy of Sciences--director of the Astronomy Institute, V. P. Shcheglov, director of the Physico-Technological Institute, S. A. Azimov, director of the Seismology Institute, G. A. Mavlyanov, chairman of the Council for the Study of Uzbekistan Productive Forces, S. K. Ziyadullayev, corresponding member of the republic's Academy of Sciences, M. M. Khayrullayev--director of the Institute of Philosophy and Law, deputy chairman of the Karakalpak Branch of the Uzbekistan Academy of Sciences, doctor of biological sciences, R. Reymov, director of the Institute for Experimental Plant Biology, doctor of biological sciences, A. A. Abdullayev.

Approval was given to a problem-topical plan for the current year which provides for the development of the most important directions in scientific research in light of the decisions of the 25th Congress of the CPSU, the October (1976) plenum of the CC CPSU, the instructions and conclusions contained in the speech by Comrade L. I. Brezhnev at the 16th Congress of the country's trade unions.

The participants of the annual meeting reviewed the results of fulfilling the socialist pledges by staffs at the institutions and organizations of the Uzbek SSR Academy of Sciences for the past year and slated the

frontiers of competition in honor of the anniversary of the Great October.

Participating in the annual meeting of the Academy of Sciences were the secretary of the Uzbekistan Central Committee of the Communist Party, A. U. Salimov, and deputy chairman of the Uzbek SSR Council of Ministers, M. T. Tursunov.

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INTERVIEW WITH PRESIDENT OF ARMENIAN ACADEMY OF SCIENCES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Mar 77 p 3

[Interview with V. A. Ambartsumyan, President of the Armenian SSR Academy of Sciences: "In Step With the Age"]

[Text] The republic now has dozens of scientific institutions employing about 18,000 scientific workers. Some 650 of them have doctorates and about 5,000 are candidates of science. In 1976-1980, institutes and laboratories of the Armenian SSR Academy of Sciences will participate in work on 36 projects of a nationwide program of research on the most important fundamental problems and will work jointly with departmental scientific institutions on 110 problems of the republic national economic plan. Collectives of the institutes and laboratories of the Armenian Academy of Sciences will cooperate with institutes of the Hungarian, GDR and Slovak academies of sciences and will support ties with scientific organizations of other socialist CEMA member-nations. About 20 million rubles in capital investments has been allocated to strengthen the experimental base of the Armenian SSE Academy of Sciences in the Tenth Five-Year Plan. Construction will be completed on the Institute of Chemical Physics in Yerevan, a mechanical optics laboratory in Ashtarak, a space astronomy laboratory in Garni, and experimental bases of the institutes of radio physics and electronics, physical research, mechanics, botany, and other institutions.

Prior to the victory of Soviet power, Armenia had not one scientific or higher academic institution, but today the achievements of republic scientists are widely known, not only in our country, but far beyond its borders. What is behind this upward flight? What is Armenian science today? What problems will the scientists be working on in the years ahead? Academician and Hero of Socialist Labor Viktor Amazaspovich Ambartsumyan, President of the Armenian SSR Academy of Sciences, answers questions from our correspondent, N. Ordinyan.

[Question] Among the many historic accomplishments of the Soviet people, a special place is occupied by the unprecedent flowering of science in all republics of the Nation of Soviets. How did science begin to develop in Armenia?

[Answer] During the initial years of the establishment of Soviet power, the republic experienced a critical need for skilled cadres. And one of the first decrees of the young republic's government was to organize a higher school, the firstborn of our science -- Yerevan University. In the pre-war period, the university and the newly organized VUZ's trained thousands of young specialists. The most capable among them were sent to Moscow, Leningrad and other scientific centers for graduate studies. Their creative growth was supervised by outstanding Russian scientists, who invested tremendous effort in training scientific cadres and developing science in Armenia.

The work done enabled us to create back in the 1930's, as part of the Armenian Branch of the USSR Academy of Sciences, the first institutes of natural and applied sciences, including a chemical and a geological institute. Their organization had a great national economic impact: in subsequent years, enterprises of large-scale chemistry were put into operation one after another and chemical science began to develop rapidly. Geological surveys led to the discovery of large copper and molybdenum deposits, which were the basis for the development of the modern nonferrous metallurgy and mining industry of Armenia.

[Question] Consequently, Viktor Amazaspovich, the development of sciences directly connected with the national economy was given priority?

[Answer] Absolutely correct. Although we did not embark on that right away. During the initial years of its existence, our Academy represented basically the social sciences, and Armenian studies in particular. This must be explained both by historical traditions and by the weakness of cadres in the physical, mathematical and other technical sciences. The Central Committee of the Armenian Communist Party, the republic government, and the academy leadership worked out the steps necessary to train mathematicians, physicists, astrophysicists, radiophysicists and technical specialists. At the same time, efforts were made to develop the geological, chemical and new branches of the biological sciences rapidly.

A strained plan for training cadres and preparing an appropriate material base was successfully carried out. By the late 1950's, by the 15th anniversary of its founding, the Armenian Academy of Sciences had available to it such modern scientific centers as the Physics Institute in Yerevan (working in the field of elementary particle physics), the Byurakan Observatory (research on the nature of galaxies), the Institute of Mathematics and Mechanics (problems of coating creep theory and analytic function theory), the Institute of Biochemistry, and others. The work of these research organizations was known both nationwide and worldwide.

[Question] Viktor Amazaspovich, in creating a broad theoretical base, the Armenian Academy of Sciences has naturally not forgotten the practical

application of fundamental research. How have the academy institutes established ties with production? In which directions has applied science been developed?

[Answer] Of course, close ties between science and production have always been and remain our primary concern. But this problem must be viewed more broadly: science must not simply help production, but must indicate new ways of developing to it. It is precisely the fundamental research begun in the institutes of the Academy of Sciences which will continue to be the basis for the creation in the republic of modern new branches of industry such as electrical engineering, tool making, radio engineering and electronics and the production of new synthetic medicines and pure chemical reagents.

The tempestuous development of the Armenian SSR national economy over the last two decades has led to a situation in which the academy institutes and laboratories have not been able to combine fundamental research successfully with meeting the needs of growing industry. It was precisely during these years that numerous departmental research and planning-design organizations were organized in the republic with the help of academy institutions. And today, the bulk of the applied scientific developments here are done by departmental research institutes. On the whole, their collectives have coped well with their tasks thanks to good fundamental developments, close ties with production, and the presence of the necessary experimental base.

[Question] What are the basic directions of scientific development in the republic and what have the main achievements of the scientists been in recent years?

[Answer] In more than half a century of swift development, Armenian science has come to occupy a definite place in the overall system of Soviet science. We participate in the development of a considerable number of major problems facing domestic science as a whole and strive to carry out our tasks at the highest possible level.

It is known that in our Academy of Sciences, much attention is paid to research on the Universe. In studying profound and previously unknown processes of the conversion of matter and energy which take place in remote space, we have made a modest contribution to research on properties of matter which are still not understood. Our astronomers were recently able to achieve new successes. A new type of system, so-called compact clusters of compact galaxies, was discovered in large numbers and named Shakhbazyan clusters, after their discoverer, a [female] associate at Byurakan Observatory.

This new and very characteristic form of occurrence of material systems in the Universe merits our greatest attention. It is precisely here that we propose to direct a considerable part of our future efforts. The 2.6-meter reflector telescope installed last year in Byurakan, one of the largest in Europe, will be of great help in this work.

Research by our mathematicians has found interesting application in the theory of electromagnetic wave propagation and diffraction. The results of fundamental work at the Institute of Mechanics have been the basis for calculations of the durability, strength and stability of various types of structures

and installations. Theoretical developments of the Institute of Radiophysics and Electronics have permitted the manufacture of highly sensitive super-high frequency receiving equipment. In so doing, the foundation has been laid for the development of new directions in radio engineering industry in Armenia.

Chemists studying the fundamental processes to which the mechanism of chemical reactions reduces have achieved substantial results, and there is no doubt as to the genuinely fundamental nature of their results. Given further development they will not only find practical application, but will even affect related areas of chemical science.

The successes of physicists concerned with radiation problems have led them to the development of practical methods of growing new "nonlinear crystals." They have found extensive application in engineering. But we consider this only the start of important work. Biochemists, microbiologists, physiologists and the collectives of a number of other institutes have also achieved important successes. Substantial advances have also occurred in the area of social sciences.

We should also mention the scientific developments of the branch institutes. Machinery developed at the Yerevan Research Institute of Mathematical Machines are well-known in this country. Quite recently, a state commission accepted the new Nairi-4 microprogrammed-control computed, which uses structural resolutions inherent to fourth-generation computers. A number of developments of the All-Union Institute of Multipurpose Electrical Equipment, the VNIIpolimer, the ArmNIImash and the "Avtomatika" Research Institute are being introduced successfully into production.

Such, in brief, are the successes and achievements with which one of the offspring of Great October, the science of Soviet Armenia, moves towards its 60th anniversary. It is not the custom of Soviet people to be satisfied with their successes, no matter how great. Therefore, thoughtfully reviewing the path travelled, we see accurately not only our achievements, but also overlooked opportunities and unused reserves. Problems of further improving all our work, raising the scientific level of the research, and improving all links in the research process, continue to remain vital.

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